IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA,	)	
	)	
Plaintiff,	)	
	)	
vs.	)	
	)	Case No. 05-CV-329-GKF-PJC
TYSON FOODS, INC., et al.,	)	
	)	
Defendants.	)	

ORDER

This matter comes before the court on the State of Oklahoma's Motion in Limine to Preclude Expert Testimony of Defendants' Witness Billy Clay [Doc. No. 2061]. Billy Clay is a doctor of veterinary medicine enlisted by defendants to analyze and characterize animal waste production in the Illinois River Watershed ("IRW"). In particular, Clay has rendered opinions regarding the number of cattle and poultry in the IRW and the amount of manure they produce.

The State has challenged both Clay's qualifications to opine on these topics and the methodology upon which his opinions are based.

I. Legal Standard

Federal Rule of Evidence 702 provides:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods to the facts of the case.

Thus, Rule 702 imposes on the trial judge an important "gate-keeping" function with regard to the admissibility of expert opinions. *Ralston v. Smith & Nephew Richards, Inc.*, 275 F.3d 965, 969 (10th Cir. 2001).

First, the court must determine whether the expert is qualified by "knowledge, skill, experience, training, or education" to render an opinion. *Id.* An expert witness is qualified under Rule 702 when he possesses "such skill, experience or knowledge in that particular field as to make it appear that his opinion would rest on substantial foundation and would tend to aid the trier of fact in his search for the truth." *Graham v. Wyeth Labs.*, 906 F.2d 1399, 1408 (10th Cir. 1990).

Second, the court must ensure that the scientific testimony being offered is not only relevant, but reliable. *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 589 (1993). The Tenth Circuit has stated:

> To be reliable under *Daubert,* an expert's scientific testimony must be based on scientific knowledge, which implies a grounding in the methods and procedures of science based on actual knowledge, not subjective belief or unsupported speculation. In other words, an inference or assertion must be derived by the scientific method...[and] must be supported by appropriate validation–*i.e.* good grounds based on what is known. While expert opinions must be based on facts which enable [the expert] to express a reasonably accurate conclusion as opposed to conjecture or speculation...absolute certainty is not required. The plaintiff need not prove that the expert is undisputably correct or that the expert's theory is generally accepted in the scientific community. Instead, the plaintiff must show that the method employed by the expert in reaching the conclusion is scientifically sound and that the opinion is based on facts which satisfy Rule 702' reliability requirements.

Dodge v. Cotter Corporation, 328 F.3d 1212, 1222 (10th Cir. 2003) (citations omitted).

In *Daubert*, the Supreme Court identified four nonexclusive factors the trial court may consider to assist in the assessment of reliability:

> (1) whether the opinion at issue is susceptible to testing and has been subjected to such testing;
>
> (2) whether the opinion has been subjected to peer review;
>
> (3) whether there is a known or potential rate of error associated with the

> methodology used and whether there are standards controlling the technique's operations; and

(4) whether the theory has been accepted in the scientific community.

Daubert, 509 U.S. at 593-94. This list is not exclusive, and district courts applying *Daubert* have broad discretion to consider a variety of other factors. *Dodge*, 328 F.3d at 1222, citing *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 150 (1999).

To be relevant, the testimony must "assist the trier of fact to understand the evidence or to determine a fact in issue." Fed.R.Evid. 702. This consideration has been described as one of "fit." *See Daubert*, 509 U.S. at 591. "'Fit' is not always obvious, and scientific validity for one purpose is not necessarily scientific validity for other, unrelated purposes." *Id.*

In sum, the objective of the gate keeping requirement "is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire*, 526 U.S. at 152.

II. Analysis

A. Clay's Qualifications

The State argues Clay is not qualified to opine regarding animal populations and their waste production, and that only agricultural engineers such as Bernard Engel are so qualified.

In addition to being a doctor of veterinary medicine, Clay has both a B.S. and an M.S. in agronomy. [Doc No. 2197, Ex. A, Clay Report, p. 35]. He has, for the past 40 years, served as an expert consultant in environmental and agronomic issues. [*Id.*, p. 36]. He has also been an animal health technical consultant for Pharmacia/Upjohn Animal Health and an animal health research

consultant for Smith Kline. [*Id.*] He has been an assistant and adjunct professor at Okalahoma State University's School of Veterinary Medicine. Born and raised in rural eastern Oklahoma, he has extensive farming and ranching experience, including raising poultry, swine and sheep. [*Id.*] He is a Diplomate with the American Board of Veterinary Toxicology. [*Id.*] One of his specialties is animal health, animal/plant interactions with an emphasis in water quality [*Id.*] and he has published articles on these subjects in peer reviewed journals, trade journals and other publications. [Doc. No. 2197, Ex. F, Clay Aff. At ¶¶2-3]. As an expert consultant, Dr. Clay has participated in studies involving the analysis of dry weight of beef and poultry manure as well as the major nutrients in beef and poultry manure. [Doc. No. 2197, Ex. B.1, Clay Dep., pp. 88-89]. He has served on the Environmental Committee on the Council on Public Health and Regulatory Veterinary Medicine in the American Veterinary Association, is a member of the American Society of Agronomy and the Council for Agricultural Science and Technology and has held several positions, including the office of President, in the Oklahoma Veterinary Association. [Doc. No.2197, Ex. A, Clay Report, pp. 37-38. He has also served as the AVMA representative to the OIE-World Health Organization for Animals. [*Id.*, p. 370.] Defendants contend that Clay, in order to obtain reliable inventory of animals present in the IRW and their activities in the IRW, drew on his "unique skills, training and knowledge concerning the growing cycles for these animals, feeding practices, and replacement practices [Doc. No. 2197, pp. 6-7].

A proposed expert should not be required to satisfy an overly narrow test of his own qualification. *See Gardner v. General Motors Corporation,* 507 F.2d 525, 528 (10th Cir. 1974). "As long as an expert stays within the reasonable confines of his subject area, our case law establishes a lack of specialization does not affect the admissibility of [the expert] opinion, but

only its weight." *Compton v. Subaru of America, Inc.*, 82 F.3d 1513, 1520 (10th Cir. 1996).

Based on his extensive and varied experience, the court finds that Dr. Clay is qualified to offer expert opinions on animal populations and animal waste.

The State has also challenged Dr. Clay's qualification to testify concerning several discreet topics, as follows:

First, the State has challenged Dr. Clay's reliance upon Dr. Raleigh Jobes to perform calculations and retrieve data regarding animal populations. The court finds, for the purpose of this motion, however, that Dr. Clay's reliance on Dr. Jobes to calculate and interpret the statistical data in his report was reasonable because Clay created and explained the methodology used by Jobes. Dr. Clay made the final decision regarding the assumptions that were made and the methodology used to determine the animal and manure numbers used in his report. [Doc No. 2197, Ex. B.2, Clay Dep., pp. 308, 327-28, 394]. Clay testified regarding that methodology. [*Id.*, pp. 356-69]. The court therefore finds that Dr. Clay's reliance upon Dr. Jobes' work was permissible under Federal Rules of Evidence 702 and 703 and *Daubert*.

Second, the State contends that Clay, without authority, asserted the State has produced no evidence that cattle producers in the IRW have violated the laws and regulations pertaining to the application of poultry litter. The State asserts Clay should have looked at records from the Oklahoma Department of Agriculture, Food and Forestry ("ODAFF"). [Doc. No. 2061, p.3]. Presumably this is because such records would indicate whether violations have occurred, but the State provides no evidence of this. Clay's report discussed at length poultry litter application in the IRW, including cattle producers' use of poultry litter. [Doc. No. 2197, Ex. A, pp. 1619]. Defendants' and Clay's rebuttal concerning the ODAFF records is that they would not be helpful

to determine whether cattle producers complied with poultry litter application laws unless the cattle producers are also certified poultry litter applicators or poultry producers. [Doc. No. 2197, p. 7]. Thus, the court finds this is an issue about which Dr. Clay may be cross-examined, but is not one which renders his methodology unreliable under *Daubert*.

Third, the State contends Dr. Clay admitted he erroneously used 2002 annual data for his poultry waste calculations and then purposely reduced that total by other data from 2007. [Doc. No. 2061, p. 5]. However, based upon the court's review, it concludes Clay did *not* testify his reliance on 2002 annual data for poultry waste was erroneous. Clay defended his use of 2002 annual data because it was the only information available, and also defended using a BMP litter export number from 2007, because litter exported out of the watershed is not available for land application in the IRW. [Doc. No. 2197, pp. 8-9, Ex. B.1, pp. 118, 123, 169, 170; Ex. B.2, pp. 327-28, 333, 344, 358-360, 391, 395; Ex. A, Clay report at 17].

Fourth, the State argues that Dr. Clay has criticized mass balance reports by Dr. Engel and Meagan Smith, but has never performed a mass balance and has never received specific education or training in its use. [Doc. No. 2061, p. 3]. However, the record shows that Dr. Clay criticized Smith's mass balance study because it did not account for all inputs and outputs. Specifically, Clay opined that the study assumed "that all phosphorus produced winds up in the IRW with ultimate direct access to the streams and/or lakes" and did not "account for livestock products sold other than beef calves" or for "all crops or produce sold." [Doc No. 2197, Ex. A, Clay Report, p. 15]. Clay does not need to be an expert in mass balance reports to opine about Smith's assumptions regarding P inputs and outputs. Therefore, the court finds Dr. Clay's opinion on this subject is permissible.

B. Clay's Methodology

The State criticizes Dr. Clay's methodology for estimating the number of poultry and cattle in IRW and the waste they generate on several grounds.

1. Method of Counting Poultry and Cattle

The State attacks Dr. Clay's methodology for counting poultry and cattle, contending he "counted" poultry (broilers and turkeys) in the IRW by using government agricultural census sales data but ignored inventory data. Then, switching methodologies, he did just the opposite for cattle, using 2002 inventory data and ignoring sales data. [Doc. No. 2061, Ex. 1, Clay Report, App. A, Table A-A and App. C, App. D, Tables DA-1, DA-2, DA-3; Ex. 2, 118-199, 123, 324, 345, 347-48, 394-95]. The State contends he also admitted that cattle might be bought and sold during the year, but still did not use the sales data, instead relying on a formula he created "for which there is no scientifically accepted authority. [*Id.*, Ex. 2, Clay Dep., pp. 345-46].

However, Dr. Clay's report and deposition provide a fairly convincing defense of his methodology. Regarding differences in how poultry and cattle were counted, Dr. Clay used data reported from the most recent National Agricultural Statistics Service, Census of Agriculture (2002) to arrive at his numbers for all types of poultry and cattle. He considered both the inventory and sales data for each. He elected to employ the data he considered most appropriate for the production of each type of animal**.** His approach recognizes that cattle are generally present in the watershed all year; most producers do not sell every head of cattle on their farm every year; most replace their cows every eight years and their bulls every four years. Heifers are raised for two years before replacing a cow. Thus, Clay believes the sales data might capture only 1/8th of the cows that are actually present in the watershed during the year and 1/4th of the

bulls present in the watershed. Using only sales data to estimate the total number of cattle in the watershed per year would result in a gross underestimate. [Doc. No. 2197, p. 11, Ex. B.2, Clay Dep., pp. 347-348]. Also, sales data do not report the actual type of cattle and only differentiates between cattle over 500 pounds and cattle under 500 pounds. [Doc. No. 2197, p. 12, Ex. B.2, Clay Dep., pp. 347-348; Ex. J. Census Form (p. 11 of Ex. 40 to Clay Dep.)] In contrast, poultry are not present in the watershed all year. A broiler producer will have an average of five separate flocks on his farm per year. Sales data will capture this, but inventory data will not. Although inappropriate to determine the total number of poultry on a farm during the year, the inventory can be used for comparison and confirmation. [Doc. No. 2197, pp. 11-12]. Also, sales data for poultry provides specific numbers of different types of poultry. [Doc. No. 2197, p. 12, Ex. H]. Defendants assert the State has mis-cited Clay's deposition, citing to an entirely different calculation Clay used to determine the total amount of wet manure produced by beef cattle. (But they don't explain whether or how Clay accounted for cattle that might have been bought and sold during the year.)

The court concludes that this methodology withstands *Daubert* scrutiny.

2. Animal Units

The State argues that Dr. Clay ignored definitions and instructions formulated by the U.S. Agricultural Census data by increasing by 30% the cattle population animal units, which inflated his cattle number and cattle waste volume calculations. Specifically, Clay counted bulls and heifers more than once to change his animal unit for cattle from 1 to 1.3, even though he admitted those animals were already accounted for in the census data. [Doc. No. 2061, p. 4, Ex. 2, Clay Dep., pp. 333-337]. His only authority for doing this was Dr. Jobes. [Doc. No. 2061, pp. 4-5, Ex.

2, Clay Dep., pp. 83-84].

However, Dr. Clay based this part of his methodology upon his analysis and use of Beef Animal Units. A Beef Animal Unit is comprised of one cow, 1/25th of a bull, 1/8th of a heifer over one year old and ½ of 1/8 of a heifer that is between the age of six months and one year. Defendants assert Clay did not add numbers to the census data, but simply allocated the reported census numbers to the appropriate Animal Unit. Then he used his Animal Units to calculate the amount of wet manure produced by cattle in the watershed. [Doc. No. 2197, Ex. B.2, Clay Dep. at 334-335, 345-346]. Clay also used Animal Units for poultry and other animals. He used the standard reference from the Natural Resource, Agriculture, and Engineering Service (NRAES), Poultry Waste Management Handbook, to determine the average weight for broilers present in the watershed at 2.25 pounds. [Doc. No. 2197, pp. 17-18, Ex. M]. The average weight provided by the Oklahoma Conservation Commission's "Comprehensive Basin Management Plan" uses an even lower weight of 2 pounds for broilers. [Doc. No. 2197, p. 18 (no cite for the plan)]. In contrast, the State's expert Meagan Smith used an average weight for broilers of 2.5 pounds. Smith did not rely on any references, but did her own calculations, estimating the average weight of broilers at the time of their sale is 5 pounds, and dividing that by two. [Doc. No. 2197, p. 18, Ex. N, Smith Dep., pp. 134-135].

The court finds that this portion of Dr. Clay's methodology survives *Daubert* scrutiny.

3. Broiler Weights

The State's next criticism of Dr. Clay is that he used an average weight for broilers lighter

than that reported by defendants in documents produced in this case and by several growers in their depositions, all of whom reported heavier average bird weights. Further, the State asserts that Dr. Clay should have made inquiries of defendants to validate actual average bird weights, and they complain that he rounded down the average number of broiler flocks grown per year, which lowered the poultry waste contribution. [Doc. No. 2061, p. 5, Ex. 2, Clay Dep., pp. 320, 326, 348-349].

The court has not been able to confirm the State's allegation that defendants provided documents reporting an average weight for broilers in excess of the amount used by Dr. Clay. Defendants have provided a sealed exhibit which shows a variation of weights of broilers; there is no average weight provided in the document. [Doc. No. 2197, p. 19, Ex. O]. Therefore, the court rejects this criticism as a basis for challenging Dr. Clay's methodology.

4. Zip Code Data

Another criticism is that Clay underestimated poultry inventory by relying upon zip code data to quantify the number of birds produced in the IRW. [Doc. No. 2061, p. 5, Ex. 5]. Exhibit 5 appears to be a map of zip code area 74964. The State contends it shows farms he missed in his inventory. Regarding Clay's use of zip codes, defendants contend the exhibit relied upon by the State (which defendants say was not timely produced) is the Zip Code where Butler Farms is located. Evidence in the record establishes that Butler Farms transports its litter out of the watershed. [Doc. No. 2197, p. 16, Ex. A, Clay Report; Ex. G, Dep. Of Sherri Herron, p. 213]. Thus, this particular challenge appears to be rebutted by the evidence.

5. Poultry Litter Weight Calculations

The final area of challenge by the State is the data Dr. Clay used for waste calculations. The State contends he disregarded reliable data regarding poultry manure and waste characteristics and instead performed a complicated calculation to further "dry" the poultry weight, thus reducing its weight and the amount of poultry waste contributed to the IRW. Further, in describing the drying process, Clay used the expression "fermentation," which the State contends is not a valid term. The State argues the calculation Clay and Jobe used is not the same as the one reported in the Agricultural Handbook, and it results in a lower number than the Agricultural Handbook data. Further, the State contends that Clay testified that comparisons of poultry waste to cattle waste must be done on a "dry versus dry" or "wet versus wet" basis, but he failed to do so himself.

Regarding Clay's calculations to determine manure weights, defendants contend that poultry growers and veterinarians know poultry litter must go through a drying (or "fermentation" as Clay termed it) process in the poultry house. [Doc. No. 2197, p. 19, Ex. B.1, Clay Dep., p. 261; Ex. M, Poultry Handbook, pp. 5-6] Authoritative literature recognizes this. [Doc. No. 2197, p. 19, Ex. M, Ex. B.1, Clay Dep. at pp. 262, 67; Doc. No. 2061, Ex. 3, Agricultural Waste Management Field Handbook]. All of the available estimates for annual litter production in the IRW, including those made by Drs. Engel and Fisher, take into consideration the drying process that poultry undergoes when it combines with the bedding materials and is maintained in the poultry house for a period of time. So, too, did Dr. Clay's. Clay's approach, as the court understands, was as follows: Manure when produced by poultry is approximately 75% moisture. After combined with the bedding materials, producers aim to maintain litter moisture at 20-25% in order to dry litter as quickly as possible to minimize ammonia in the poultry house. Both the Agricultural

Handbook and Clay start with census data regarding manure. The difference between the approach used by the Agricultural Handbook and the approach Clay uses is that the Agricultural Handbook is a formula for determining *dry* litter, i.e., 24% for broilers, and Clay's calculation uses the census data to calculate wet manure, , i.e. 75% moisture, then applies a calculation to determine the amount of dry litter (24%) based on the wet manure number. [*Id.*].

Thus, while Clay's methodology might subject to criticism upon cross-examination, it meets the *Daubert* test for reliability. Therefore, his testimony concerning volumes of poultry litter waste will be admissible.

III. Conclusion

The court finds that Dr. Clay is qualified to testify regarding animal populations and animal waste in the IRW, and that his methodology was reliable. Therefore, the State's Motion in Limine to Preclude Expert Testimony of Billy Clay [Doc. No. 2061] is denied.

ENTERED this 12th day of August, 2009.

Gregory K. Frizzell
United States District Judge
Northern District of Oklahoma